Amendments to the Claims

This listing will replace all prior versions and listings of claims in the application:

Listing of Claims

1. (original) A method of separating water from air comprising the steps of:

(a) contacting air having water vapour with an hygroscopic liquid mixture to produce a water rich hygroscopic liquid mixture;

(b) heating at least a portion of the water rich hygroscopic liquid mixture to produce a gaseous mixture including water vapour and at least one other gaseous component;

(c) condensing at least a portion of the water vapour in the gaseous mixture to produce liquid water and a depleted gaseous mixture at a first pressure; and

(d) removing at least a portion of the at least one other gaseous component to maintain the first pressure below a predetermined pressure.

wherein the depleted gaseous mixture is in fluid communication with the water rich hygroscopic liquid mixture being heated.

2. (original) The method as claimed in claim 1, wherein the predetermined pressure is subatmospheric.

3. (original) The method as claimed in claim 1, wherein the predetermined pressure is between 25 Torr and 760 Torr.

4. (original) The method as claimed in claim 2, wherein at least a portion of the water vapour is absorbed by the hygroscopic liquid mixture during the contacting in step (a).

5. (original) The method as claimed in claim 4, wherein the method further comprises the step of separating the liquid water from the depleted gaseous mixture such that the depleted gaseous mixture is disposed in a vapour space above the liquid water.

6. (original) The method as claimed in claim 5, wherein the removing in step (d) occurs in response to a high concentration indication of one of the at least one other gaseous component.

7. (original) The method as claimed in claim 5, wherein the removing in step (d) occurs in response to a high pressure indication in the vapour space.

8. (original) The method as claimed in claim 5, wherein the removing in step (d) occurs in response to a low temperature indication in the vapour space.

9. (original) The method as claimed in claim 5, wherein the removing of at least a portion of the at least one other gaseous component is effected by a vacuum pump.

10. (original) The method as claimed in claim 9, wherein the hygroscopic liquid mixture is an aqueous lithium chloride solution.

11. (original) A method of separating water from air comprising the steps of:

(a) contacting air having water vapour with an hygroscopic liquid mixture to produce a water rich hygroscopic liquid mixture;

(b) heating at least a portion of the water rich hygroscopic liquid mixture to produce a gaseous mixture having water vapour;

(c) condensing at least a portion of the water vapour in the gaseous mixture to produce liquid water and heat energy; and

(d) transferring an effective amount of the heat energy to a working fluid including a liquid to effect vapourization of at least a portion of the liquid to produce a working fluid gaseous mixture.

12. (original) The method as claimed in claim 11, wherein the condensing is effected at least in part by the transferring in step (d).

13. (original) The method as claimed in claim 12, wherein the working fluid is contained in a heat pipe.

14. (original) The method as claimed in claim 13, wherein the hygroscopic liquid mixture is an aqueous lithium chloride solution.

15. (original) The method as claimed in claim 14, wherein the condensing is effected at a subatmospheric pressure.

16. (original) A method of recovering water from air comprising the steps of:

(a) contacting air having water vapour with an hygroscopic liquid mixture to produce a water rich hygroscopic liquid mixture;

(b) in a first pressure envelope, heating the water rich hygroscopic liquid mixture to produce a gaseous mixture having water vapour, condensing at least a portion of the water vapour in the gaseous mixture to produce liquid water and a depleted gaseous mixture, and separating the liquid water from the depleted gaseous mixture so as to provide collected liquid water and a depleted gaseous mixture at subatmospheric pressure disposed in a vapour space above the collected liquid water;

(c) effecting fluid pressure communication between a second pressure envelope and the vapour space; and

(d) flowing the collected liquid from the first pressure envelope and into the second pressure envelope.

17. (original) The method as claimed in claim 16, wherein the flowing step (d) is effected by draining the collected liquid water by gravity.

18. (original) The method as claimed in claim 17, wherein the second pressure envelope is a tank.

19. (original) The method as claimed in claim 18, wherein the hygroscopic liquid mixture is an aqueous lithium chloride solution.

20. (original) The method as claimed in claim 19, wherein a vacuum pump is fluidly coupled to the vapour space to effect removal of at least a portion of the depleted gaseous mixture to maintain pressure within the vapour space at a subatmospheric pressure, and wherein the vacuum pump is also configured to effect evacuation of the tank.

21. (withdrawn) An absorption system for effecting removal of water from atmospheric air by an hygroscopic liquid mixture comprising:

an absorber vessel defining a space for facilitating contact between air having water vapour and an hygroscopic liquid mixture, including:

an input air flow inlet, configured for introducing an input air flow having water vapour into the space;

a depleted air flow outlet, configured for discharging a depleted air flow; and

means for introducing a hygroscopic liquid mixture into the space for effecting contact between the hygroscopic liquid mixture and the input air flow;

a base;

wherein the absorber vessel is rotatably mounted to the base about an axis for effecting positioning of the input air flow inlet at a desired position relative to the axis.

22. (original) A method of recovering water from air comprising:

(a) providing an absorption system for effecting removal of water from atmospheric air flow by an hygroscopic liquid mixture comprising:

an absorber vessel defining a space for facilitating contact between air having water vapour and an hygroscopic

liquid mixture, including an input air flow inlet, configured for introducing an input air flow having water vapour into the space, a depleted air flow outlet, configured for discharging a depleted air flow, and means for introducing a hygroscopic liquid mixture into the space for effecting contact between the hygroscopic liquid mixture and the input air flow; and

a base;

wherein the absorber vessel rotatably mounted to the base about an axis for effecting positioning of the input air flow inlet at a desired position relative to the axis;

(b) measuring the direction of atmospheric air flow; and

(c) rotating the absorber vessel about the axis so as to effect desired positioning of the input air flow inlet relative to the atmospheric air flow direction in response to the measured atmospheric air flow direction.

23. (withdrawn) An absorber vessel defining a space for facilitating contact between air having water vapour and an hygroscopic liquid mixture, including:

an input air flow inlet, configured for introducing an input air flow having water vapour into the space;

a depleted air flow outlet, configured for discharging a depleted air flow;

at least one first liquid inlet spray nozzle, configured for introducing a largest diameter fine size droplet into the space at a first position;

a second liquid inlet spray nozzle, configured for introducing a largest diameter coarse size droplet into the space at a second position disposed in closer proximity to the outlet relative to the introduced largest diameter fine size droplet;

wherein the largest diameter coarse size droplet has a greater diameter than the largest diameter fine size droplet when the same liquid is flowed through each of the first and second liquid inlet spray nozzles under the same operating conditions.

24. (withdrawn) The apparatus as claimed in claim 23, wherein the largest diameter coarse size droplet has a diameter which is 100 times greater than a diameter of the largest diameter fine size droplet when the same liquid is flowed

through each of the first and second liquid inlet spray nozzles under the same operating conditions.

25. (withdrawn) The apparatus as claimed in claim 23, wherein the largest diameter coarse size droplet has a diameter which is 1,000 times greater than a diameter of the largest diameter fine size droplet when the same liquid is flowed through each of the first and second liquid inlet spray nozzles under the same operating conditions.

26. (withdrawn) The apparatus as claimed in claim 23, wherein the largest diameter coarse size droplet has a diameter which is 100,000 times greater than a diameter of the largest diameter fine size droplet when the same liquid is flowed through each of the first and second liquid inlet spray nozzles under the same operating conditions.

27. (original) A method of separating water from air comprising the steps of:

providing an absorber vessel defining a space for facilitating contact between air having water vapour and an hygroscopic liquid mixture;

introducing an air flow into the space;

spraying first hygroscopic liquid mixture droplets into the space for effecting contact between the first hygroscopic liquid mixture and the air flow, wherein at least one of the first hygroscopic liquid mixture droplets is a largest diameter fine size droplet; and

spraying second hygroscopic liquid mixture droplets into the space downstream of the first hygroscopic liquid mixture droplets for effecting contact between the second hygroscopic liquid mixture and the air flow containing an entrained portion of the first hydroscopic liquid mixture droplets, wherein at least one of the second hygroscopic liquid mixture droplets is a largest diameter coarse size droplet;

wherein the largest diameter coarse size droplet has a greater diameter than the largest diameter fine size droplet.

28. (original) The method as claimed in claim 27, wherein the largest diameter coarse size droplet has a diameter which is 100 times greater than the diameter of the largest diameter fine size droplet.

29. (original) The method as claimed in claim 27, wherein the largest diameter coarse size droplet has a diameter which is 1000 times greater than the diameter of the largest diameter fine size droplet.

30. (original) The method as claimed in claim 27, wherein the largest diameter coarse size droplet has a diameter which is 100,000 times greater than the diameter of the largest diameter fine size droplet.

31. (original) A method of separating water from air comprising the steps of:

(a) contacting air having water vapour with a hygroscopic liquid mixture consisting of a supersaturated aqueous solution of lithium chloride to produce a water rich hygroscopic liquid mixture;

(b) heating at least a portion of the water rich hygroscopic liquid mixture to produce a gaseous mixture including water vapour and at least one other gaseous component;

(c) condensing at least a portion of the water vapour in the gaseous mixture to produce liquid water.

32. (original) A method of separating water from air comprising the steps of:

(a) contacting air having water vapour with an hygroscopic liquid mixture to produce a water rich hygroscopic liquid mixture;

(b) heating at least a portion of the water rich hygroscopic liquid mixture with heat generated by a waste heat source to produce a gaseous mixture including water vapour; and

(c) condensing at least a portion of the water vapour to produce liquid water.